San Diego Astronomy Association

Celebrating Over 50 Years of Astronomical Outreach

February 2023

https://www.sdaa.org/
A Non-Profit Educational Association
P.O. Box 23215, San Diego, CA 92193-3215

Next SDAA Business Meeting
February 14th at 7:00pm
10070 Willow Creek Rd
San Diego, CA 92131
Via Zoom

Next Program Meeting
February 15th at 7:00pm
Live stream

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February 2023, Vol LXI, Issue 2
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San Diego Astronomy Association
Incorporated in California in 1963

Newsletter Deadline
The deadline to submit articles for publication is the **15th** of each month.

Program Meeting February 15th

Topic: The Wacky World of Exoplanets and How We Discover Them
Speaker: Dennis Conti, PhD, Chair, AAVSO Exoplanet Section, AAVSO Board Member

Dennis Conti is a retired telecommunications professional and an amateur astronomer with a strong interest in exoplanet research. In 2015, he founded the AAVSO's Exoplanet Section and has continued as section leader since. Dennis is also on the board of the AAVSO.

Exoplanets (planets outside our solar system) we now know come in all sizes, compositions, and orbital configurations around their host star. Some are even free floating! Although there are several theories, we still do not know for certain how most exoplanets were formed. What is certain, however, is that our overall knowledge of these distant and strange worlds has grown exponentially in the last few years and amateur astronomers have played a key role in their discovery.

This presentation will review: the role exoplanet discoveries play in our quest for life outside our solar system, what some of the challenges are in discovering exoplanets, and how observations by amateur astronomers have been essential in making these discoveries.

The February 2023 Program Meeting will be virtual via ZOOM

Link to SDAA Merchandise Store https://sdaa28.wildapricot.org/SDAA-Store

Link to Outreach Calendar https://calendar.google.com/calendar/embed?src=g-calendar@sdaa.org&ctz=America/Los_

San Diego Astronomy Association

San Diego Astronomy Association Board of Directors Meeting
January 10, 2023 – Unapproved and subject to revision

1. **Call to Order**
   The meeting was held via Zoom and was called to order at 7:02 pm with the following board members in attendance: Dave Wood, President; Kin Searcy, Vice President; Melany Biendara, Treasurer; Gene Burch, Recording Secretary; Alicia Linder, Corresponding Secretary; Dave Decker, Director; Mike Chasin, Director; Hiro Hakozaki, Director; Gracie Schutze, Director; Steve Myers, Primary Grid Reconstruction committee and member Bee Pagarigan.

2. **Approval of Last Meeting Minutes**
   The December meeting minutes were approved.

3. **Treasurers & Membership Report**
   The treasurer's report was approved. Mel has handed over the treasurer's role to Mike Chasin. Mike reported that all is well, we've renewed our Survey Monkey account and we're still working with an attorney to resolve the counterfeit check they cashed on our account.

4. **Standard Reports**
   a. Site Maintenance Report:
   No report.

   b. Observatory:
   No Report.

   c. Loaner Scope Report:
   Three telescopes currently out: SDAA-004 (Meade LX-90), due Jan 21; SDAA-027 (beginner astrophotography rig), due Feb 18; SDAA-030 (AWB OneSky) proxy loan through Dave Decker, due Mar 1-ish.

   SDAA-026 (Zhumell 8") and SDAA-028 (Bushnell 8") are expected to be loaned out on Jan 14.

   SDAA-001 has been sold to a non-member Marc Weyl for $250. I'll be picking the scope up on Jan 14 and will deliver it to him.

   Two loaner scopes are pending sale to members, featured in the banquet auction/raffle: SDAA-002 (Takahashi 4" newt), SDAA-024 (Celestron SPC8). Releasing these scopes from the loaner program will free up much-needed space in the storage container and simplify operations for the loaner program.

   d. Private Pad Report:
   We have 14 people on the waiting list (one is a current pad lessee looking to upgrade) and 7 unleased pads. 4 of the 7 are along the south fence near the water tower. I plan to lease one pad before I leave town on the 24th (there are multiple people interested in the pad and I'm encouraging them to consider sharing it). Note that although there is a decent waiting list, there is a general reluctance to sign new leases until there is some clarity on the new grid and how it affects the private pads.

Pad 22 submitted a plan to upgrade the supports for his solar panels and the panel installation. This pad is/will be automated and is entirely off grid. The original supports were wood but didn't hold up as well as expected so he's replaced it with a metal truss design. He is also changing the panel installation from 2 panels mounted horizontally to 4 mounted vertically. The overall footprint is very close to the original installation since he also changed the angle of the panels. Since the support replacement is a repair of the original and the panels are within the bounds of his original BOD approval, I gave him approval to proceed.

e. Program Meetings Report:
Kin reported that he has speakers lined up for the banquet, February and March, which will be an in person meeting at MTRP. He's working on April and hopes to do something weather related.

f. AISIG Report:
We still don't have an AISIG chairperson, but David Wood may take over the position after he steps down as president later this month.

g. Newsletter Report:
As always, the newsletter looks great – Thanks, Andrea!

h. Website Report:
No report from Jeff but the GoDaddy email migration was painful.

i. Social Media:
No report – but to date, our YouTube channel has had over 79,000 views and we have 563 followers.

j. Outreach Report:

Outreach Report – For December, 2022

Below is a summary of outreach event participation with numbers for December and for YTD:

2022	December	YTD
Events Completed	**4**	**88**
Events Cancelled	**2**	**29**
Total Attendance	**249**	**5671**

December is always a slow month for outreach programs. But, the highlight for the month was certainly the Lunar occultation of Mars, occurring on December 7, which was of course, Pearl Harbor Day, and also a full moon night. And, all this great stuff was visible from Balboa Park in the early evening hours while Dr. Lisa Will was hosting the "The Sky Tonight" show in The Fleet Planetarium!

Oh, one more spectacular circumstance… Mars was at opposition! Big Mars, hiding behind a Big Moon, while SDAA hosted the event in front of The Fleet Science Center. Not much better than that. The crowd hung out for the entire occultation, watching Mars slip behind, then appear an hour later on the South-West side. It was a nice way to finish out 2022.

k. TARO Report:
TARO is currently shut down. The issues that were reported last month have not yet been addressed. And the weather sucks.

l. Cruzen Report:
No site updates since the November report.

Gene added a new "Cruzen observatory" member attribute in Wild Apricot, and I'm working with him to get sufficient access so I can set that value on members' profiles. The plan is to update this field manually for now, and depending on the amount of work that creates, perhaps implement an automated system in the future.

My next visit to Cruzen will be in early February. I'll be pouring a concrete pad in front of the door to eliminate the tripping hazard at the door threshold. I also found some inexpensive LED desk lamps that I fitted with red filters. I did some initial testing with the donated laptop and it looks like it will work great, though I might need to buy some more RAM for it. I plan to have the "facilities" documentation more or less completed by the February excursion, with the Schaefer and G11 documentation finished up in late February / early March. We are still on track for a March/April commissioning.

m. Merchandise Report:
We had a good response to our special order of shirts; all the orders have been filled and the store has been restocked. We'll be offering merchandise at the banquet.

n. Astronomical League Report:
Nothing to report.

o. JSF Report:
After several years of heading the JSF committee, Dan and Sandy Kiser are stepping down, and we need someone to step in to fill their very large shoes. The board wants to thank Dan, Sandy and their amazing family for doing an incredible job putting JSF together. Last year's event was one of the best. - Great job Kiser family!

p. Primary Grid Reconstruction Report:
Grid Planning is ongoing. We are behind in getting the plans completed for the County although the engineer has the electrical usage data that Ed, Mike Chasin and Kin helped compile.

5. Old Business:

a.	Bank Fraud Update – (see treasurer's report)	Biendara
b.	Banquet Updates – planning is going well	Chasin
c.	Power Security Gate Quotes/Updates – still working on the details	Chasin
d.	Other old business – none	

6. New Business:

a. Club Document Archives -Google for non-profits-
Steve Myers is working on setting up a Google Workspace that should help with document storage and perhaps club emails too. Myers

b. Other new business - none

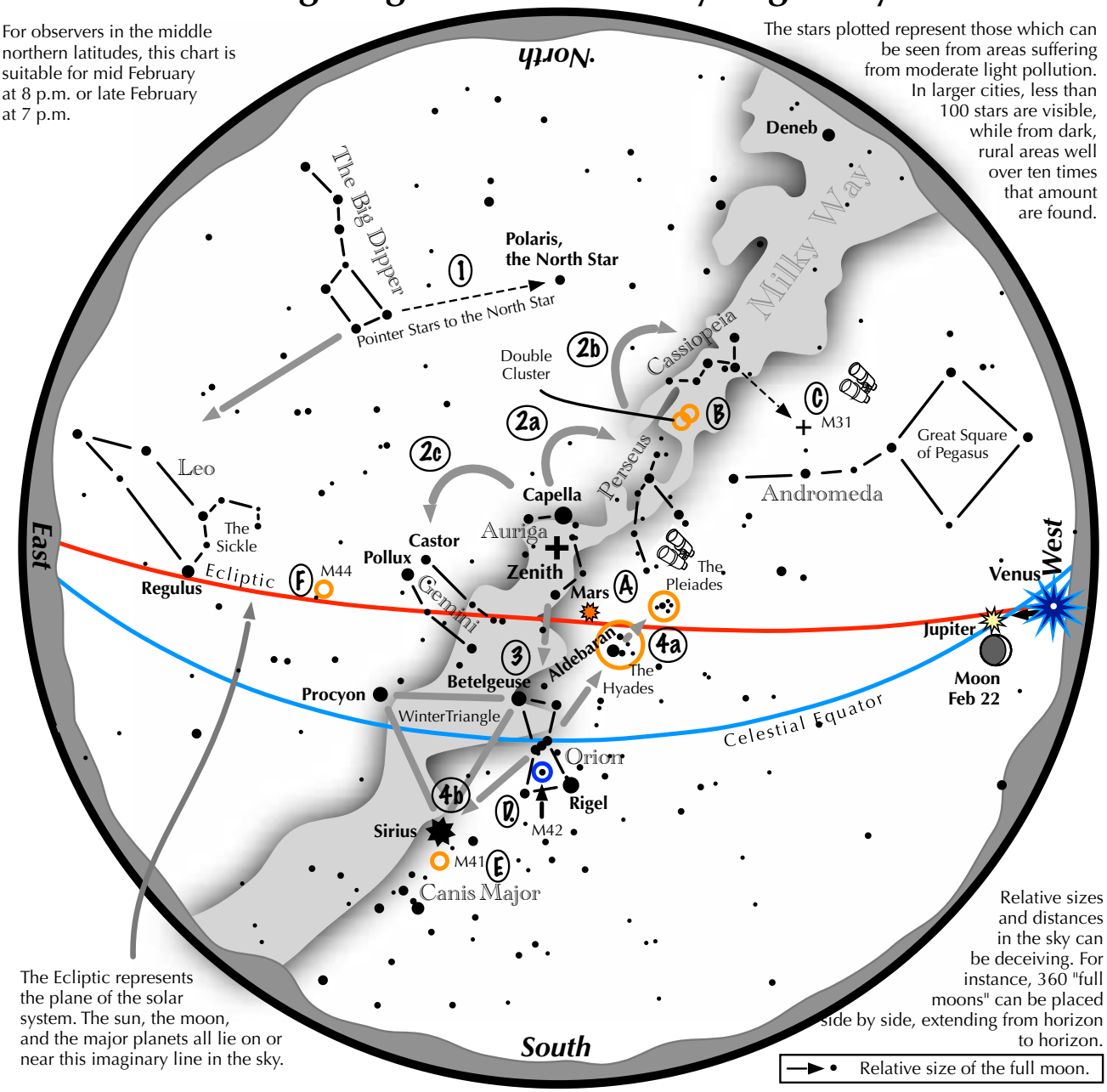
7. Adjournment: The meeting was adjourned at 8:18 pm.

San Diego Astronomy Association

Navigating the mid February Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid February at 8 p.m. or late February at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

—▶• Relative size of the full moon.

Navigating the February night sky: Simply start with what you know or with what you can easily find.

1. Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
2. Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next jump southeastward from Capella to the twin stars of Castor and Pollux in Gemini.
3. Directly south of Capella stands the constellation of Orion with its three Belt stars, its bright red star Betelgeuse, and its bright blue-white star Rigel.
4. Use Orion's three Belt stars to point northwest to the red star Aldebaran and the Hyades star cluster, then to the Pleiades star cluster. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius, a member of the Winter Triangle.

Binocular Highlights

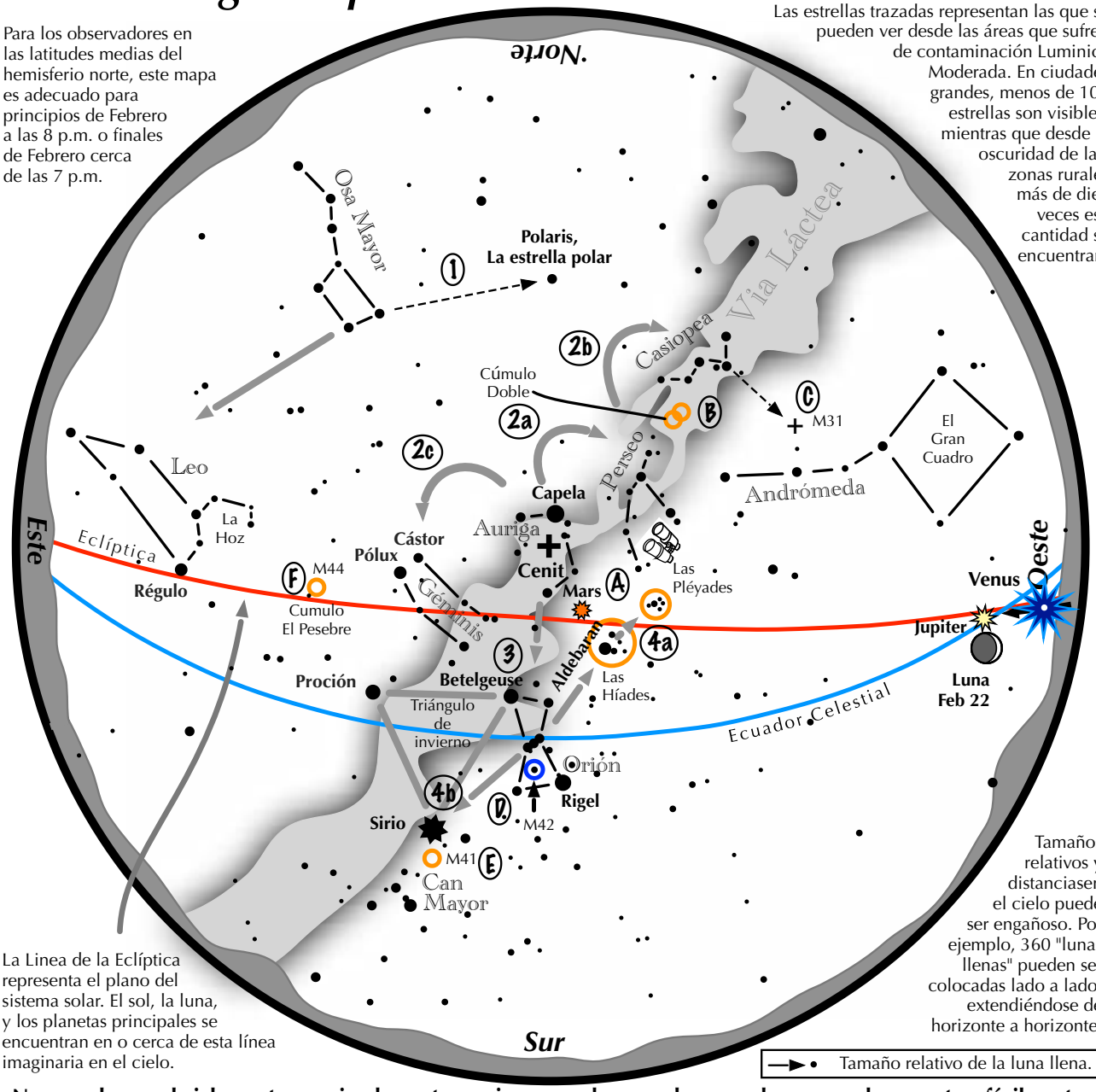
A: Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.
B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.
C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
D: M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41. **F:** M44, a star cluster barely visible to the naked eye, lies southeast of Pollux.

San Diego Astronomy Association

Navegando por el cielo nocturno de Febrero

Para los observadores en las latitudes medias del hemisferio norte, este mapa es adecuado para principios de Febrero a las 8 p.m. o finales de Febrero cerca de las 7 p.m.

Las estrellas trazadas representan las que se pueden ver desde las áreas que sufren de contaminación Luminica Moderada. En ciudades grandes, menos de 100 estrellas son visibles, mientras que desde la oscuridad de las zonas rurales más de diez veces esa cantidad se encuentran.



La Linea de la Eclíptica representa el plano del sistema solar. El sol, la luna, y los planetas principales se encuentran en o cerca de esta línea imaginaria en el cielo.

Tamaños relativos y distanciasen el cielo puede ser engañoso. Por ejemplo, 360 "lunas llenas" pueden ser colocadas lado a lado, extendiéndose de horizonte a horizonte.

—►• Tamaño relativo de la luna llena.

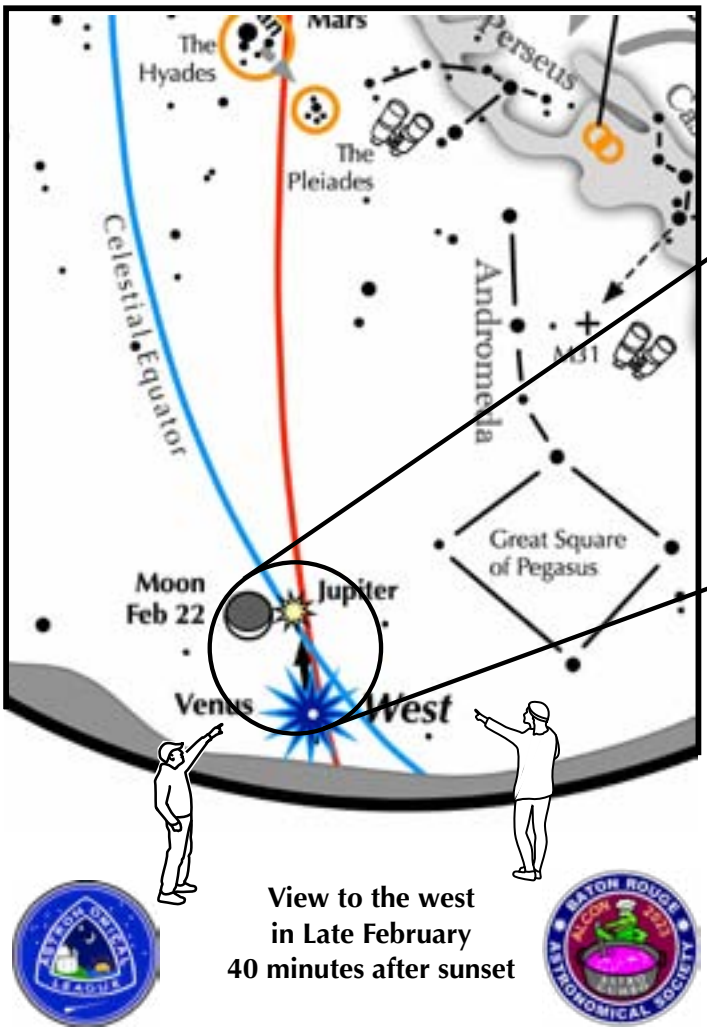
Navegando por el cielo nocturno: simplemente comience con lo que sabe o con lo que puede encontrar fácilmente.

1. Sobre el horizonte noreste se alza la Osa Mayor. Dibuja una línea desde sus dos estrellas finales hasta la estrella polar.
2. Desde Capela, salte hacia el noroeste a lo largo de la Vía Láctea hacia Perseo, luego hacia la "W" de Casiopea. Siguiente salto hacia el sureste desde Capela a las estrellas gemelas de Cástor y Pólux en Géminis.
3. Directamente al sur de Capela se encuentra la constelación de Orión con sus tres estellas del Cinturón de Orión, su brillante estrella roja Betelgeuse y su brillante estrella azul-blanca Rigel.
4. Usa las tres estrellas del Cinturón de Orión para apuntar al noroeste hacia la estrella roja Aldebarán y el cúmulo estelar Hiades, y luego hacia el cúmulo estelar de las Pléyades. Viaja hacia el sureste desde las estrellas del cinturón hasta la estrella más brillante en el cielo nocturno, Sirio. Es un miembro del Triángulo de invierno.

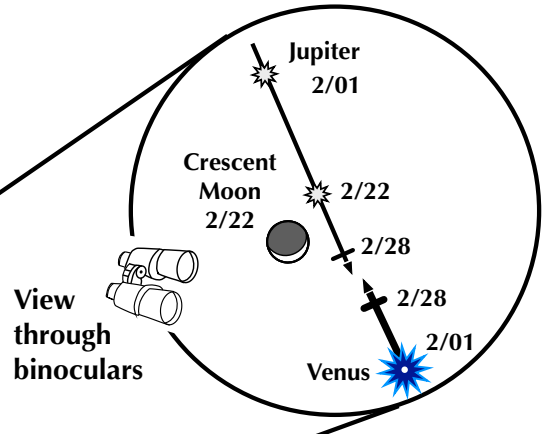
Puntos destacados con binoculares

A: Examina las estrellas de las Pléyades y las Híades. **B:** Entre la "W" de Casiopea y Perseo se encuentra el Doble Cúmulo de Perseo. **C:** Las tres estrellas más occidentales de la "W" de Casiopea apuntan hacia el sur hasta M31, la Galaxia de Andrómeda, un óvalo "borroso." **D:** M42 en Orión es una nebulosa formadora de estrellas. **E:** Mire al sur de Sirio para ver el cúmulo estelar M41. **F:** M44, un cúmulo de estrellas apenas perceptible a simple vista, se encuentra al sureste de Pollux.

In the early evenings during the second half of February, try this challenge:



View to the west in Late February 40 minutes after sunset



Venus approaches Jupiter

On February 1, Venus appears low above the western horizon 40 minutes after sunset. As the month proceeds, the bright planet climbs higher each evening. Jupiter, on the otherhand, begins the month much higher than Venus, and drops closer to the horizon each evening.

On February 22, the crescent moon joins the scene as it floats left of Jupiter. Look to the west 40 minutes after sunset for the pair. Binoculars allows you to admire the softly glowing earthshine on the night side of the moon. Almost magical!

For the rest of the month, Jupiter approaches Venus. Watch their gap narrow each evening. Finally, on March 1, they nearly bump into each other.

Another Look February, 2023

New Moon-February 20, Full Moon-February 5

February 5 will mark the Lunar New Year for many cultures, celebrated in their own particular way. Since it signifies renewal, the February new moon is called by some the “House of the Burning Moon” and the “Budding Moon.
South-Western Native Americans called it the “Moon of Purification and Renewal”. Other Native Americans call it the Snow Moon or Bone Moon while it’s the Celtic Moon of Ice.
Our modern name is Snow Moon

Transiting the meridian and near the zenith in the evening hours in February and March when the weather is changing from frigid to merely cold, it is no wonder that herdsmen from the fertile crescent to Scandinavia north identified Castor and Pollux as harbingers of spring, when herds grew and grain sprouted.

> *Instead of twin brothers, however, the ancients imagined these stars represented two Kids. There was a significance in this title quite apart from its relation to the herds that they were daily concerned with. We see in this region of the sky three ancient and important constellations named after domestic animals that figured prominently in the pastoral life of early times, the Ram, the Bull, and the Kids. Plutarch tells us that "in the reproduction of species among the herds familiar to primitive man, the first produced in the vernal season are the lambs, then come the calves, and later the kids, so that it was natural that the ancients who devised the constellations should characterise(sic) in this order the three constellations through which the sun passed in the vernal season.* *“Star Lore of All Ages” Olcott*

The two stars are almost universally identified as twins throughout our western culture though seen differently from Egypt to Polynesia and Australia.

To the Australian aborigine they were two young men chasing the young women of the Pleiades. the Arabs saw two peacocks, the Egyptians two sprouting plants, and the Hindus twin deities, while in the Buddhist zodiac they represented a woman holding a golden cord and the Polynesian Islanders a pair of twins. It is also interesting to learn that the Bushmen of South Africa identified the two stars as young women, the wives of the Eland, their great antelope and the Gemini were the Ape of the early Chinese solar zodiac. Later on, in China, the constellation was known as the Yin/Yang, two principals familiar to us today.

What this tells us is that for thousands of years cultures have identified the stars of Gemini with the position and path of the sun, moon, planets and their location against the stars signifying special times of the year. We are told that on the Babylonian monuments and boundary stones, the oldest we have, there is a set of symbols repeated over and over again, and always given a position of

prominence. It is the so-called "Triad of Stars," a crescent lying on its back and two stars near it.

The significance is that four thousand years BC, Castor and Pollux served as indicators of the first new moon of the year, just as the star Capella did two thousand years later. This Traid of the moon and two stars is a picture of what men saw in the sunset sky, at the beginning of the first month 6000 years ago.

The Triad of Stars
From a Babylonian Boundary Stone
Approximate date 1200 B.C.

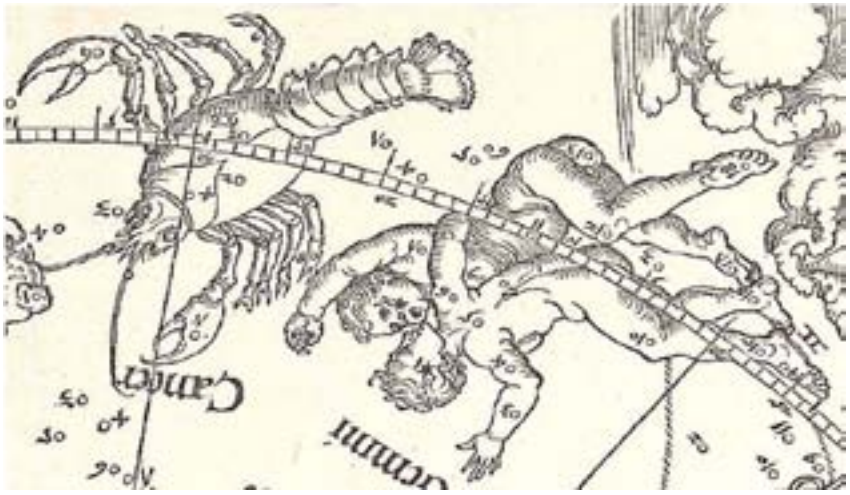
It is the earliest record of an astronomical event that has made its way to us.

The name Gemini as we know it has only been such since classical times. It comes from the Latin geminī, plural of geminus, meaning “twin. The Greeks and the Romans know them as Castor and Pollux, twin brothers of different fathers, hatched from an egg, one immortal and one not. Still, I don’t think the name Gemini actually was used till the 13th century when the first charts were drawn and globes constructed.

I have never been all that interested in Castor and Pollux. I see them as a pair of bullies always looking for a fight. The Romans saw them leading their armies in battle and the Greeks saw them as crew on the Argos in its search for the golden fleece.

Safe comes the ship to Haven
Through billows and through gales,
If once the great Twin Brethren
Set shining on the sails. *Macaulay.*

Public Domain



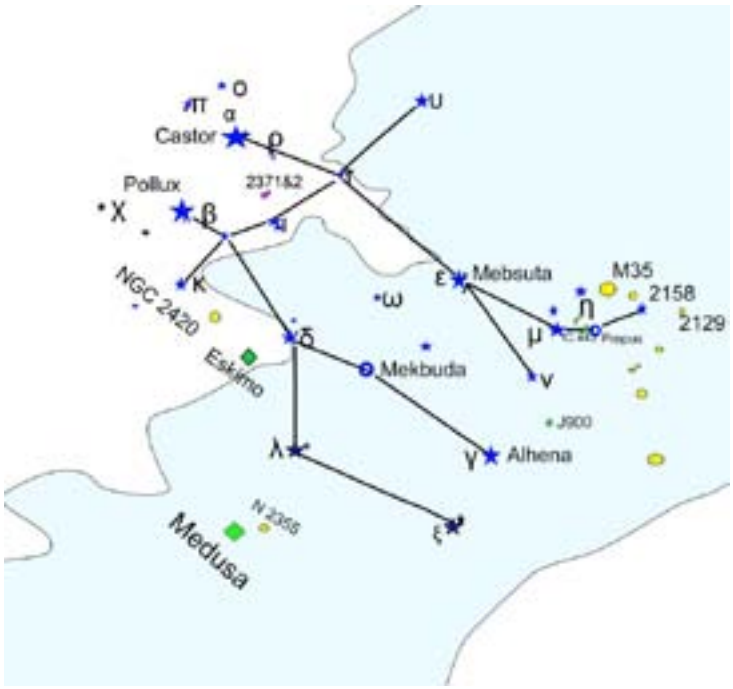
https://www.metmuseum.org/art/collection/search/358366

Albrecht Dürer | The Celestial Map- Northern Hemisphere 1515

The twins are also the first reference we have to the atmospheric phenomenon known today as St. Elmo's fire; an electrical glow off the tips of masts and spars on our old wooden sailing ships. During the three years I spent at sea I never saw it personally but a report taken from one of the survivors of Magellan's circumnavigation describes the fire of the twins during its passage through the strait.

Last night saw Saint Elmo's stars,
With their glittering lanterns all at play
On the tops of the masts and the tips of the spars,
And knew we should have foul weather to-day.
Longfellow's "Golden Legend of the Padrone"

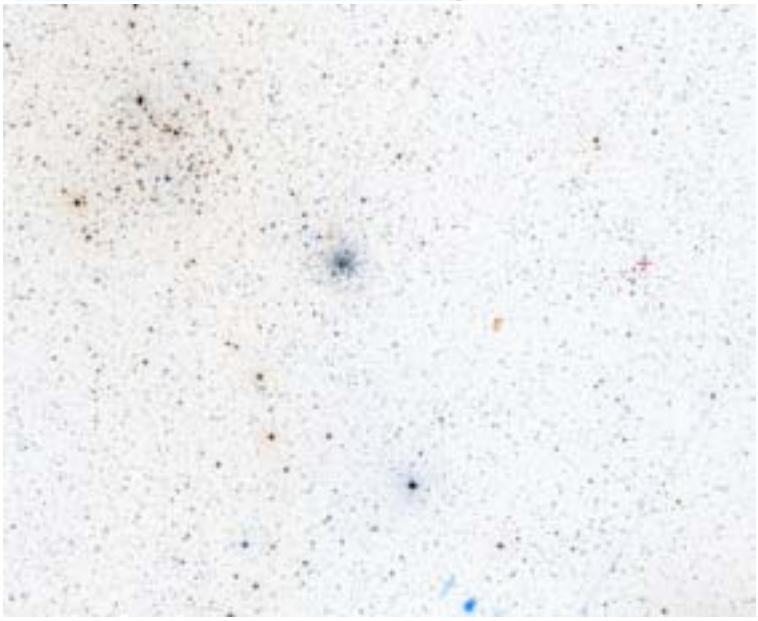
No less a luminary as Herschel named Castor, α Geminorum, as the "finest example of a double star in the northern hemisphere". Smyth in the "Bedford Catalog" gives it three pages, Webb a long description and Houston rhapsodized over its companions noticeable change in position angle. We still use Castor as a primary star, using a Sextent, in Celestial navigation.



Physically, Castor is a sextuplet, three visible stars and each with its own spectroscopic binary. The three visible components are essentially 2, 3 and 10th magnitudes and can be split in a three inch refractor, though I am pretty sure I never looked for C. While up there check out 5th magnitude pi π, it has an 11th magnitude companion.

While we are speaking about superlatives, at the foot of Castor is M35, one of our finest examples of an open cluster. NGC 2158 is next to M35 and NGC 2159, marked by a cross. IC 2157 is next to N2129 and difficult.

Dripping down from the foot of Castor like icicles on a fir tree is a line of star clusters and objects curving into and out of Gemini. All are visible in your telescope. The one that struck me was



a difficult planetary Scotty mentioned in his column. Jonckheere 900 also known as PK 194+2.1 and J900, is a planetary nebula that will be a tough find at 12th mag. In the area, just over the border into Orion is NGC 2174-5, the Monkey Head. I mention it because local astrophotographer Rick Gonzalez took this amazing image.

NGC 2174-5Rick "Speedy" Gonzalez

If by now, you are asking "why so many open clusters?", remind yourself that we are still in theMilky Way and clusters and nebula permeate, we are not done yet, we have a few more doozys.

NGC 2420 is up by the Eskimo so you can use it as a starting off point for star hopping. N2420 will come up on you quickly as a dense misty patch but will resolve nicely to your telescopes limit. It's 8th magnitude and interestingly right on the ecliptic. Another interesting open cluster is over by the Medusa, NGC 2355. Its nice, a few bright stars, a few red ones and easy to pick out from the background. N2355 is 10th magnitude and 10 arcmin across.

https://en.wikipedia.org/wiki/NGC_2355#/media/File:NGC2355_-_SDSS_DR14_(panorama).jpg

https://simbad.u-strasbg.fr/simbad/sim-id?Ident=NGC+2420Up

On the other side of Gemini, making the top of the spindle with ι, ρ and τ is the Gemini double planetary. It's small and only 11th magnitude but visible in your 8".

NGC Catalog #2371

I did some comparisons. Tycho is 45 arcmins. Picture him in your telescope. The Gemini double, NGC 2371 and 2372, are .73 arcmins. Use an OIII filter if you have one. Modern images show a lobed shape, though different telescopes

can show different images, the double NGC designation comes from the reports Draper got after it was found. The Herschel's reported two nebula with a dark lane between them, hence the two number designation. There are magnitude differences based on the authority, but the NGC catalog lists 11.2, so I'm sticking to it until I find two sources tha agree on the same number.$

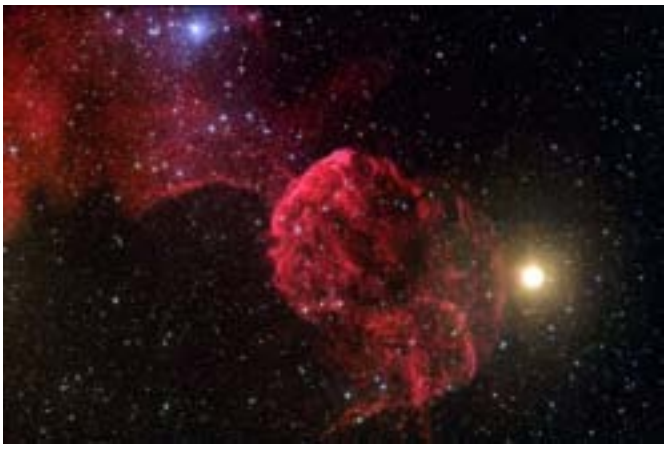
There are three amazing deep sky wonders in Gemini that are almost certainly on every amateurs to-do list.

The first is the Eskimo Nebula, NGC 2392, Caldwell 39, and also know familiarly as the Clown Face. Some years back my club had a Monday evening at Griffith Observatory's beautiful 12" Zeiss refractor. The image of the nebula was nothing short of amazing. So is its size. By comparison, NGC 2392 is just a smidge smaller then Copernicus in your eyepiece.

The Medusa Nebula is a little off by itself closer to Canis Minor and not too far from NGC 2395, an open star cluster of 8th magnitude. The Medusa , also Abell 21, is a lot fainter, about 16th magnitude, though, from the attached image I grabbed from Simbab, they are of about the same angular dimensions, 14x14 arcmin, though maybe the Medusa is a little closer to 10 arcmin, about a third the size of the full moon.

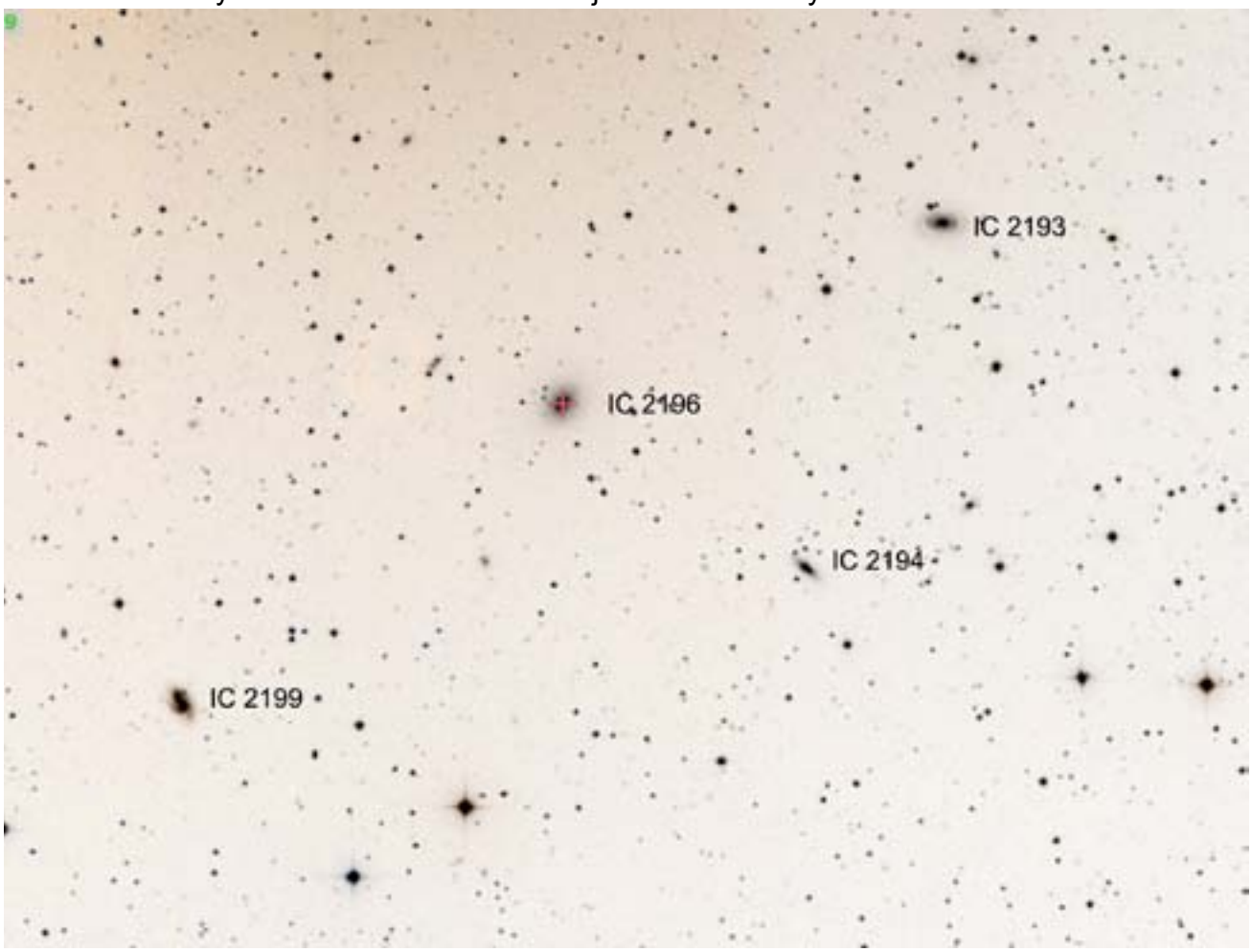
https://simbad.cds.unistra.fr/simbad/simidIdent=ngc+2395&NbIdent=1&Radius=2&Radius.unit=arcmin&submit=submit+id

Https://ocastronomers.org/wp-content/uploads/2018/12/IC443-102608-HaRGB-S.jpg John Castillo



Back in the late 80's while writing for a local astronomy club, I offered a challenge to find a supernova remnant near the foot of Castor. Fast forward 40 years and IC 444 and IC 443 are easy pickings for our stellar astrophotographers. It will still be a challenge

visually, however. I could see the bright rim in the 17” and even trace some of the nebulosity that extends from I443 to I444.
Its down there by Propus, η Geminorum and is in a very rich field of objects, next to Collinder 89, M35 and NGC 2128 as well as η and μ. H’ς proper name is Tejat Prior and also Propus. Propus is a triple star system but probably more famously the planet nearest Uranus when it was discovered by Herschel. M’ς proper name is Tejat Posterior, meaning the Heel.
You can put Mu and Eta in the same field and see the extent of IC’s 443 and 444, but I don’t know how much you can capture with your eye. Its bright enough at 11th magnitude but so spread out its hard to see. I used a Hα back then, you will do better.
You can find images all over the internet of the nebula, the OCA website has a dozen, but I chose this one by John Castillo because it is just extraordinary.



https://simbad.cds.unistra.fr/simbad/sim-id?Ident=ic+2196&NbIdent=1&Radius=2&Radius.unit=arcmin&submit=submit+id

The last five objects this month were described by Scott Houston in his “Deep Sky Wonders” column he wrote for over 40 years for Sky and Telescope magazine. Near Castor about a degree north is NGC 2410 a 13th magnitude spiral galaxy that was discovered, cataloged and rediscovered several times.
The other four are NGC’s 2193, 2194, 2196 and 2199. Just below Castor, you can see the glow of him in the image. They are all 12th and 13th magnitude galaxies that Scotty thought might rival Stephan’s Quintet. I think you’ll get’em with your 12.5” and good, dark skies.

Dark Skys Dave Phelps

Astrophotography Exhibit

A new restaurant/bar recently opened in Oceanside called KNVS (pronounced, "Canvas") which is an art-themed venue. The owner, Kevin Shin, is on the board of the Oceanside Museum of Art and created the place to showcase local artists and their work in exhibits that run for 3-4 months. The hors d'oeuvres and drinks are created to align with the theme of the art on display. Kevin is a self-proclaimed astronomy nerd and invited the SDAA to share our images from November 11th through February. This is an excellent outreach opportunity for the club. SDAA members stepped up and submitted 171 digital and 22 printed images from 24 astrophotographers covering 85 different targets. A 5-member judging panel faced the daunting task of selecting which of those spectacular images would be included in the exhibit. There is space on the walls for 12-15 printed images and 2 digital projectors will display slideshows of digital images. We're working to get some guest speakers for some "special event" evenings as well. Kevin Shin is already amping up the hype on social media. If you haven't had the pleasure of visiting KNVS and the Switchboard restaurant next door, it is definitely worth dropping by.

EXOPLANET WATCH GOES LIVE

Many of you have followed and participated in JPL/NASA's Exoplanet Watch program through its development over the past two+ years. Rob Zellem of JPL spoke to us at our (in person!) program meeting in the fall of 2019. Now Exoplanet Watch was formally launched for observers worldwide at the AAS Meeting in Seattle in January. If you want to catch up with what has happened, here's a page on their website that has all their Newsletters to get you started: https://exoplanets.nasa.gov/exoplanet-watch/newsletters/ Boyce-Astro (info@boyce-astro.org) is always looking for observers and telescope operators to support the program.

DoubleSTARS SEMINAR – SPRING 2023

Boyce-Astro will be starting their Fifteenth! seminar in February 2023 for observing double stars and publishing results in scientific journals. Boyce-Astro will educate you in the science, provide telescope time, and mentor you through to your publication in a scientific journal. Students range from high school age to retirees. If you are interested (or if you have a child or grandchild who might be interested), go to https://boyce-astro.org/doublestars/ for more information and registration if desired.

San Diego Astronomy Association

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Have a great new piece of gear? Read an astronomy-related book that you think others should know about? How about a photograph of an SDAA Member in action? Or are you simply tired of seeing these Boxes in the Newsletter rather than something, well, interesting?

Join the campaign to rid the Newsletter of little boxes by sharing them with the membership. In return for your efforts, you will get your very own byline or photograph credit in addition to the undying gratitude of the Newsletter Editor. Just send your article or picture to Newsletter@SDAA.Org.

This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Spot the King of Planets: Observe Jupiter

David Prosper

Jupiter is our solar system's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, just like Galileo did over 400 years ago.

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1300 Earths to fill it up – and that would still not be quite enough! However, despite its awesome size, Jupiter's true rule over the outer solar system comes from its enormous mass. If you took all of the planets in our solar system and put them together they would still only be half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar system and also draw them into itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe, but also observers back on Earth!

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition. That's impressive for a planet that, at its closest to Earth, is still over 365 million miles *(587 million km)* away. It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million miles *(968 million km)*! While the King of Planets has a coterie of around 75 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Calisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the *Galilean moons.* Most telescopes will show the moons as faint star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter, or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red Spot, and the shadows of the Galilean moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening - and night to night – can be a rewarding project! You can download an activity guide from the Astronomical Society of the Pacific at bit.ly/drawjupitermoons

NASA's Juno mission currently orbits Jupiter, one of just nine spacecraft to have visited this awesome world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has since been extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. In 2024 NASA will launch the Europa Clipper mission to study this world and its potential to host life inside its deep subsurface oceans in much more detail. Find the latest discoveries from Juno and NASA's missions at nasa.gov.

This stunning image of Jupiter's cloud tops was taken by NASA's Juno mission and processed by Kevin M. Gill. You too can create amazing images like this, all with publicly available data from Juno. Go to missionjuno.swri.edu/junocam to begin your image procession journey – and get creative!

Full Image Credit: NASA/JPL-Caltech/SwRI/MSSS; Processing: Kevin M. Gill, license: CC BY 2.0) https://creativecommons.org/licenses/by/2.0/ Source: https://apod.nasa.gov/apod/ap201123.html

Look for Jupiter as it forms one of the points of a celestial triangle, along with Venus and a very thin crescent Moon, the evening of February 22, 2023. This trio consists of the brightest objects in the sky – until the Sun rises! Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Keep watching Jupiter and Venus as the two planets will continue to get closer together each night until they form a close conjunction the night of March 1. Image created with assistance from Stellarium.

San Diego Astronomy Association

2023 TDS Star Party Schedule

Date	Type	Sunset	Astro. Twi.	Moonrise(set)	Illum.†	Notes	Hosts
2/11/2023	Public	5:30 PM	6:53 PM	11:14 PM	72.0%		
2/18/2023	Member	5:36 PM	6:59 PM	6:23 AM	3.7%		
3/18/2023	Member	6:58 PM	8:20 PM	5:55 AM	12.6%		
3/25/2023	Public	7:03 PM	8:26 PM	(11:40 PM)	20.9%		
4/15/2023	Member	7:18 PM	8:44 PM	4:29 AM	24.8%	Mercury at greatest eastern elongation. (4/11)	
4/22/2023	Public	7:23 PM	8:51 PM	(10:27 PM)	8.6%	Lyrids peak night Apr 22-23 (ZHR 18)	
5/13/2023	Public	7:39 PM	9:13 PM	3:03 AM	38.5%		
5/20/2023	Member	7:43 PM	9:20 PM	(9:14 PM)	1.6%	Mercury at greatest western elongation. (5/29)	
6/10/2023	Public	7:56 PM	9:37 PM	1:36 AM	52.8%	Venus at greatest eastern elongation. (6/4)	
6/17/2023	Member	7:58 PM	9:40 PM	8:03 PM	0.3%		
7/8/2023	Public	7:59 PM	9:39 PM	12:07 AM	67.3%		
7/15/2023	Member	7:57 PM	9:35 PM	4:36 AM	3.9%		
8/12/2023	Public	7:36 pm	9:06 PM	3:26 AM	12.2%	Perseids peak night of Aug 12-13 (ZHR 100)	
8/19/2023	Member	7:29 PM	8:57 PM	(9:23 PM)	10.9%	Saturn at Opposition. (8/27)	
9/9/2023	Public	7:02 PM	8:26 PM	2:17 AM	24.5%		
9/16/2023	Member	6:53 PM	8:16 PM	(7:52 PM)	3.0%	Neptune at Opposition. (9/19)	
10/7/2023	Public	6:25 PM	7:47 PM	1:07 AM	40.2%	Draconids Meteor Shower. (10/7)	
10/14/2023	Member	6:16 PM	7:38 PM	(6:22 PM)	0.0%	Annular Solar Eclipse. (partial here)	
11/4/2023	Public	5:55 PM	7:18 PM	11:54 PM	57.8%	Taurids peak night Nov 4-5. (ZHR 5)	
11/11/2023	Member	4:49 PM	6:14 PM	5:34 AM	2.8%	Uranus at Opposition - Nov 13	
12/9/2023	Member	4:42 PM	6:10 PM	4:22 AM	12.0%	Mercury at greatest eastern elongation. (12/4)	
12/16/2023	Public	4:44 PM	6:12 PM	(8:54 PM)	20.1%	Geminids peak night Dec 13-14 (ZHR 150)	

† Illumination at meridian crossing.

†† Published *zenithal hourly rate(s)* ZHR vary widely between sources.

AmazonSmile Donations

The SDAA board wants to thank members for using the AmazonSmile donation link. However, Amazon plans to wind down AmazonSmile by February 20, 2023.

MEMBERSHIP INFORMATION

Send dues and renewals to P.O. Box 23215, San Diego, CA 92193-3215 or renew on-line. The notice that your membership in SDAA will expire is sent by email. Dues are $60 for Contributing Memberships; $40 for Basic Membership; $70 for Private Pads; $5 for each Family membership.